



Food and Agriculture
Organization of the
United Nations

SLC/FIAF/R1273 (En)

FAO
Fisheries and
Aquaculture Report

ISSN 2070-6987

WESTERN CENTRAL ATLANTIC FISHERY COMMISSION

Report of the

SECOND MEETING OF THE WECAFC/CRFM/IFREMER WORKING GROUP ON SHRIMP AND GROUND FISH OF THE NORTH BRAZIL-GUIANAS SHELF

Bridgetown, Barbados, 17–18 May 2018



WESTERN CENTRAL ATLANTIC FISHERY COMMISSION

Report of the

SECOND MEETING OF THE WECAFC/CRFM/IFREMER WORKING GROUP ON SHRIMP AND
GROUND FISH OF THE NORTH BRAZIL-GUIANAS SHELF

Bridgetown, Barbados, 17-18 May 2018

Required citation:

FAO. 2019. *Report of the Second Meeting of the WECAFC/CRFM/IFREMER Working Group on the Shrimp and Groundfish of the Northern Brazil-Guianas Shelf*. FAO Fisheries and Aquaculture Report No. 1273. Bridgetown. Licence: CC BY-NC-SA 3.0 IGO.

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views or policies of FAO.

ISBN 978-92-5-131616-0

© FAO, 2019



Some rights reserved. This work is made available under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 IGO licence (CC BY-NC-SA 3.0 IGO; <https://creativecommons.org/licenses/by-nc-sa/3.0/igo/legalcode>).

Under the terms of this licence, this work may be copied, redistributed and adapted for non-commercial purposes, provided that the work is appropriately cited. In any use of this work, there should be no suggestion that FAO endorses any specific organization, products or services. The use of the FAO logo is not permitted. If the work is adapted, then it must be licensed under the same or equivalent Creative Commons licence. If a translation of this work is created, it must include the following disclaimer along with the required citation: "This translation was not created by the Food and Agriculture Organization of the United Nations (FAO). FAO is not responsible for the content or accuracy of this translation. The original [Language] edition shall be the authoritative edition."

Disputes arising under the licence that cannot be settled amicably will be resolved by mediation and arbitration as described in Article 8 of the licence except as otherwise provided herein. The applicable mediation rules will be the mediation rules of the World Intellectual Property Organization <http://www.wipo.int/amc/en/mediation/rules> and any arbitration will be conducted in accordance with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL).

Third-party materials. Users wishing to reuse material from this work that is attributed to a third party, such as tables, figures or images, are responsible for determining whether permission is needed for that reuse and for obtaining permission from the copyright holder. The risk of claims resulting from infringement of any third-party-owned component in the work rests solely with the user.

Sales, rights and licensing. FAO information products are available on the FAO website (www.fao.org/publications) and can be purchased through publications-sales@fao.org. Requests for commercial use should be submitted via: www.fao.org/contact-us/licence-request. Queries regarding rights and licensing should be submitted to: copyright@fao.org.

Preparation of this document

This is the report of the Second Meeting of the WECAFC/CRFM/IFREMER Working Group on the Shrimp and Groundfish of the Northern Brazil-Guianas Shelf, which was held in Bridgetown, Barbados from 17 to 18 May 2018.

Representatives from the following countries and regional partner organizations participated: Brazil, France (French Guiana), Guyana, Suriname, Trinidad and Tobago, Caribbean Large Marine Ecosystem Project (CLME+), Caribbean Network of Fisherfolk Organizations (CNFO), Caribbean Regional Fisheries Mechanism (CRFM), Centre for Resource Management and Environmental Studies (CERMES) and National Oceanic and Atmospheric Administration (NOAA).

The meeting was made possible through financial support provided by the FAO-UNOPS Inter-Agency Agreement on “Catalising Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and the North Brazil Large Marine Ecosystems” (Project UNJP/RLA/217/OPS), which is focused on the shrimp and groundfish fishery resources of the North Brazil-Guianas Shelf, and the Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fisheries (REBYC-II LAC) project, which includes Brazil, Suriname and Trinidad and Tobago among the beneficiary countries in the region.

The meeting was convened by Mr Fabian Blanchard of IFREMER. FAO technical assistance to the working group and its preparation was provided by Mr Carlos Fuentesvilla, Ms Tarub Bahri and Mr Jeremy Mendoza. Additional technical support was provided by Mr Marc Taconet and Mr Yann Laurent during workshop development. The meeting was also attended by the newly appointed WECAFC Secretary Ms. Yvette Diei Ouadi. Administrative and logistical support was provided by Ms Nakeida Gibson and Ms Valerie Schneider.

This report contains a record of the meeting, including presentations and discussions.

Abstract

The Second meeting of the Working Group on Shrimp and Groundfish of the North Brazil Guianas Shelf was held in Barbados 17-18 May, 2018. The meeting brought together 25 participants including Working Group members, fisheries officers, fisherfolk representatives, academia, government organizations and FAO. The scope of the working group is to provide scientific and management advice for the sustainable management of the shrimp and groundfish resources of the Northern Brazil-Guianas shelf in the WECAFC Region.

The participants reviewed and analyzed the current state of data collection and fisheries management for each country in the North Brazil Guianas Shelf. Also, an update was made on the WECAFC-FIRMS partnership and the outcomes of the 1st Meeting of the Fisheries Data and Statistics Working Group that took place in Barbados, 14-16 May 2018.

The assessment of data limited fisheries was presented as an approach to consider for the North Brazil Guianas Shelf shrimp and groundfish fisheries. Additionally, the current status and necessary steps to develop a sub-regional EAF management plan for shrimp and groundfish were discussed, as well as the need to enhance capacity in stock assessment techniques in the sub-region. The Governance Effectiveness Assessment Framework (GEAF) was presented as a mean to assess the CLME+ Strategic Action Programme (SAP). This assessment would be developed for the fisheries of the North Brazil Guianas shelf based on indicators covering the main issues in the sub-region: fisheries, pollution and biodiversity/habitats.

Working Group participants also reviewed and discussed the draft regional strategy for bycatch management in the WECAFC Area developed by the REBYC II LAC project. Finally, based on working group discussions and the requirements for sustainable management of the shrimp and groundfish resources of the North Brazil Guianas Shelf, a draft recommendation was prepared for consideration of the upcoming 17th session of WECAFC.

CONTENTS

Preparation of this document	iii
Abstract.....	iv
Abbreviations and acronyms	vi
Opening of the workshop	1
Attendance.....	1
Scope and goal of the working group	2
Brief review of the 1st Working Group Meeting.....	2
Meeting objectives.....	2
Adoption of the agenda.....	2
Update on the work and terms of reference of the working group	3
Update on regional projects	3
Status of shrimp and groundfish stocks in the north Brazil Guianas shelf	5
Brazil.....	5
French Guiana.....	6
Guyana	6
Suriname.....	7
Trinidad and Tobago.....	8
Information for assessment and management.....	9
Update on WECAFC/FIRMS	9
Outcomes of the Working Group on Fisheries Data and Statistics.....	9
Summary of the state of data and statistics for shrimp and groundfish.....	10
Update on the status of stock distribution, including genetic analysis.....	11
Assessment and management of data poor fisheries.....	11
Sub-regional EAF fisheries management plan	12
Governance effectiveness assessment framework	13
Regional strategy on bycatch management	14
Recommendations to wecafc	15
Next steps for working group.....	15
Date and place of the next meeting.....	16
Closure of the meeting	16
Appendix 1. List of participants	17
Appendix 2. Meeting agenda.....	19
Appendix 3. Draft regional strategy on bycatch management	21
Appendix 4. Draft recommendations from WG on shrimp and groundfish for 17th session of WECAFC.....	30

Abbreviations and acronyms

BRD	Bycatch Reduction Device
CC4FISH	Climate Change Adaptation in the Eastern Caribbean Fisheries Sector Project
CERMES	Centre for Resources Management and Environmental Studies
CLME+	Caribbean and North Brazil Shelf Large Marine Ecosystems Project
CNFO	Caribbean Network of Fisherfolk Organizations
CRFM	Caribbean Regional Fisheries Mechanism
DCRF	Data Collection Reference Framework
EAF	Ecosystem Approach to Fisheries
EBM	Ecosystem Based Management
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization
FIRMS	Fishery and Resources Monitoring System
FMP	Fishery Management Plan
GEAF	Governance Effectiveness Assessment Framework
GEF	Global Environment Facility
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
iMARINE	Data e-Infrastructure Initiative for Fisheries Management and Conservation of Marine Living Resources
IUU	Illegal, Unreported and Unregulated (Fishing)
LBP	Land Based Pollution
LME	Large Marine Ecosystem
MCS	Monitoring, Control and Surveillance
MSC	Marine Stewardship Council
NBSLME	North Brazil Shelf Large Marine Ecosystem
NOAA	National Oceanographic and Atmospheric Administration (USA)
OSPESCA	Central America Fisheries and Aquaculture Organization
REBYC II LAC	Project on Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fisheries
RFB	Regional Fishery Body
RFMO	Regional Fishery Management Organization
SAG	Scientific Advisory Group (WECAFC)
SAP	Strategic Action Program (CLME+)
SOMEE	State of the Marine Environment and Associated Economies (CLME+)
TED	Turtle Excluding Device
UNEP	United Nations Environment Programme
UWI	University of the West Indies
VRE	Virtual Research Environment
WECAFC	Western Central Atlantic Fishery Commission

Opening of the workshop

1. participants to the meeting were welcomed by Mr Fabian Blanchard (IFREMER), Working Group Convener. The opening address was made by Ms Lystra Fletcher-Paul, FAO Sub-Regional Coordinator for the Caribbean. Ms Fletcher-Paul welcomed the participants and highlighted the presence of a diverse representation from government agencies, private sector and regional organizations. She also underlined the significance of the shrimp and groundfish fisheries in the North Brazil-Guianas shelf, as drivers of employment, food security and commerce, and how FAO regards the sustainability of shrimp and groundfish fisheries as central to its goal of eliminating malnutrition and reducing poverty in the region.
2. The FAO Sub-Regional Coordinator recalled that the Working Group was reactivated in 2015, in order to provide scientific and management advice for the sustainable management of shrimp and groundfish in the North Brazil-Guianas Shelf. On that occasion, the working group evaluated the bio-economic and management status of the main fisheries and opened an avenue for investment in the areas critical for sustainable management.
3. FAO and its regional partners have been working for the past three years to address the recommendations stemming from that 2015 meeting. This support has mainly come in the form of two regional projects addressing shrimp and groundfish.
4. The GEF- funded project on Sustainable Management of Bycatch in Latin American and Caribbean Trawl Fisheries (REBYC-II LAC) is being implemented, within the sub-region, in Brazil, Suriname and Trinidad and Tobago. The project supports the collection of catch composition data, the building of capacity to implement the ecosystem approach to fisheries (EAF), the development of new/improved trawl fishing technology, the sustainable utilization of bycatch and the pursuit of enhanced/strengthened livelihoods for fishers.
5. FAO –WECAFC is also seeking to fulfill the commitments that all partners made under the project to catalyze the implementation of the Strategic Action Plan of the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+). For FAO-WECAFC, these commitments are focused around the development of national and regional management plans for shrimp and groundfish fisheries, as well as the fight against illegal, unreported and unregulated (IUU) fishing across the sub-region. Under CLME+, FAO is coordinating a project that will invest in these priority actions in fulfillment of the strategic action plan. The efforts by FAO-WECAFC, and the meetings of this working group, are an opportunity to achieve an ecosystem approach to shrimp and groundfish fisheries in the sub-region.
6. Ms Fletcher-Paul ended her opening remarks by wishing a fruitful output to the meeting and a pleasant stay in Barbados to working group members and participants.

Attendance

7. Stakeholders, including fishery officers, industrial and small-scale fisheries representatives from several countries and regional partner organizations attended the meeting. Namely, representatives from Brazil (via Skype), France (French Guiana), Guyana, Suriname, and Trinidad and Tobago, as well as the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) Project, the Caribbean Network of Fisherfolk Organizations (CNFO), the Secretariat of the Caribbean Regional Fisheries Mechanism (CRFM), the Centre for Resource Management and Environmental Studies (CERMES) and the National Oceanographic and Atmospheric Administration (NOAA) of the United States of America. The list of 25 participants, including working group members and resource persons is presented in Appendix 1.

Scope and goal of the working group

8. The scope of the working group is to provide scientific and management advice for the sustainable management of the shrimp and groundfish resources of the Northern Brazil-Guianas shelf in the WECAFC Region. In undertaking its work, the working group will pay due attention to the Code of Conduct's Article 6.4 of the General Principles and the principles of the Ecosystem Approach to Fisheries.
9. Using a multidisciplinary approach, the working group will contribute to the sustainable management of the shrimp and groundfish resources of the Northern Brazil-Guianas shelf by providing management advice to Members of WECAFC based on the best available knowledge. In pursuing this goal, the working group will contribute to the fulfilment of national and regional responsibilities for the marine environment and for the management of the shrimp and groundfish resources, and related or interacting species or fisheries in the WECAFC Region under the Code of Conduct for Responsible Fisheries, in line with the principles of the Ecosystem Approach to Fisheries and in accordance with agreed, documented management goals.

Brief review of the 1st Working Group Meeting

10. The current version of the working group met for the first time in September 2015, in response to the recommendation of the 15th Session of the WECAFC to reactivate the working group. During the first session of the reactivated working group, held in Barbados 7-8 September 2015, members evaluated the management of fisheries in the region, reviewed a bio-economic analysis of the main fisheries, and evaluated potential investment plans to implement the CLME+ Strategic Action Plan (SAP) on shrimp and groundfish fisheries. Participants also agreed to the terms of reference for the working group. The 16th Session of WECAFC endorsed the terms of reference of the WG and called upon WECAFC, CRFM and IFREMER to ensure regular meetings of the working group, given the crucial social and economic impact of these fisheries, and called upon all partners and projects in the region to work together to implement the CLME+ SAP.

Meeting objectives

11. The purpose of the meeting is to enhance collaboration and cooperation amongst working group partners to achieve Recommendation WECAFC/16/2016/5 on the management of shrimp and groundfish fisheries in the WECAFC area and achieve the Working Group's long-term goal.

For this session, the objectives of the meeting are:

- a. To present and discuss updated information on current management of the shrimp and groundfish fisheries.
- b. Evaluate status of socio-economic and biological data for these fisheries and identify the most pressing data needs for successful management.
- c. Assess and evaluate a draft regional strategy for bycatch management
- d. Review steps and propose actions and investments to develop and implement a regional management plan for shrimp and groundfish.

In addition, the meeting aims to bring together national and regional projects targeting shrimp and groundfish fisheries (i.e. CLME+ Shrimp and Groundfish Project, the REBYC-II LAC Project, the CC4Fish project and Steward Fish project)

Adoption of the agenda

12. The meeting adopted the Agenda presented in Appendix 2

Update on the work and terms of reference of the working group

13. Mr Blanchard (IFREMER) presented the terms of reference of the working group (Information document WECAFC/SAG/VIII/2017/inf.20 Available www.fao.org/fi/staticmedia/MeetingDocuments/WECAFC/WECAFC17/inf20e.pdf) as presented to the VIII Meeting of the WECAFC Scientific Advisory Group (SAG) on 3-4 November 2017 in Merida, Mexico. Mr Taconet (FAO) commented that letter (L) of the working group activities was too restrictive, as it only mentioned collaboration with the WECAFC/CRFM/OSPESCA Working Group on IUU. He suggested that the scope should be expanded to include, for example, the Working Group on Fisheries Data and Statistics or other relevant WECAFC joint working groups. Ms Cummings (NOAA) proposed to review letters K and L of the working group terms of reference. Mr Fuentevilla (FAO) suggested that participants should review the terms of reference and make their suggestions for changes on the following day.
14. Mr Blanchard also made an overview of the 1st Meeting of the Working Group, including the background documents presented at that meeting, as well as Recommendation WECAFC/16/2016/5 “On the Management of Shrimp and Groundfish Resources in the WECAFC Area”, which was adopted by the 16th Meeting of the WECAFC.
15. The Working Group Convener also covered the work plan activities for the period 2015-2018 that were established during the 1st Meeting of the Working Group in 2015. Mr Fuentevilla (FAO) commented that some of the proposed activities were in execution but others had not yet initiated, especially those related to stock assessments and illegal, unreported and unregulated (IUU) fishing.

Update on regional projects

16. Ms Walker, Senior Project Officer (SPO) of the UNDP/GEF Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) Project, informed the meeting that Strategy 6, and its associated actions, of the 10-year politically endorsed CLME+ SAP focuses on “Establishing governance arrangements for implementing ecosystems based management of the Guianas-Brazil continental shelf.” In an attempt to assist the region with the implementation of the CLME+ SAP, the GEF Secretariat approved the 5-year Project: “Catalysing Implementation of the Strategic Action Programme for the sustainable management of shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems.”
17. Ms Walker (CLME+ Project) indicated that under Component 3 of the CLME+ Project, Output 3.2 – Transition to an ecosystem approach for the shrimp and groundfish fisheries of the North Brazil Shelf Large Marine Ecosystem - supports the implementation of Strategy 6 of the CLME+ SAP. She then provided an overview of the activities under this Sub-Project. These include, *inter alia*: the development of a sub-regional data policy to support EAF management; the development of a sub-regional management plan for shrimp and groundfish; the development of national management plans; and adoption of measures to combat IUU fishing.
18. Ms Walker (CLME+ Project) informed the Working Group that when the shrimp and groundfish sub-project was first defined, it was to be a four-year project, however project activities are now to be implemented in 18 months. The Working Group was asked to consider, based on the number of activities which need to be implemented, if the new timeline was perceived to be realistic. Ms Walker then provided the meeting with an overview of the SAP Monitoring and Evaluation Framework and the State of Marine Ecosystems and Associated Economies (SOMEE) reporting mechanism, which are being developed to, amongst other things, track CLME+ SAP implementation.

19. Mr Mahon (CERMES) commented on the UNEP-North Brazil Shelf Large Marine Ecosystem (NBSLME) project, in which effects of sources of land based pollution (LBP) and habitat degradation were to be monitored in a number of coastal communities in the region. He also mentioned projects on mangrove ecosystems being carried out by Conservation International in Guyana and Suriname, as well as a national project by Brazil. Mr Fuentevilla (FAO) mentioned that fisherfolk in the sub-region frequently bring up the lack of data on LBP and habitat degradation, and their effects on fisher communities and fish populations. Mr Blanchard (IFREMER) commented on work being done in French Guiana and other areas of the Caribbean regarding Sargassum influx and pollution problems related to metal content of Sargassum, as well as toxicity from the decomposition of this seaweed.
20. Ms Ferreira (Trinidad and Tobago) enquired about the status of the State of Marine Environment and Associated Economies (SOMEE) report of the CLME+ project. Ms Walker (CLME+ Project) informed that the contents of the report were already defined and approved. In principle data for report preparation will come from other sources (e.g. United Nations Agencies) and information provided by individual countries. For example, UNEP was preparing a report on the status of pollution in the area of the Cartagena Convention and a report on the state of habitats in the Caribbean.
21. Mr Fuentevilla (FAO) presented an update on the REBYC II LAC project. The countries participating in the project are Brazil, Colombia, Costa Rica, Mexico, Suriname, and Trinidad and Tobago with collaboration from the private sector, regional fisheries organizations, NGOs, universities and research centers. The project has four main integrated components: 1) legal and institutional frameworks; 2) responsible fishing practices; 3) livelihoods, food and nutrition, and gender balance; 4) learning and experience sharing. The main goal of the project is to reduce food loss, enhance biodiversity and support sustainable livelihoods by improving the management of bycatch. The project has had several positive impacts in participating countries, such as the establishment of national working groups on bycatch, improved collaboration with the fishing sector, capacity building with support from NOAA, regional workshops on bycatch, testing of fishing gear, review and update of national legislations and regulations, and strengthened and more involved organizations. Mr Fuentevilla also elaborated on the main challenges and risks faced by the project at the technical and operational levels.
22. Ms Walker (CLME+ Project) enquired about project duration and organization of national working groups. Mr Fuentevilla (FAO) mentioned that project timeline is 2015-2020 and that the project is approaching its mid-term. Originally, the project working groups were established to follow project activities, but evolved into bycatch management committees. Ms Diei Ouadi (FAO) asked how the lack of cooperation between agencies was affecting the project and if the Forum (www.fao.org/in-action/rebyc-2/forum/en/) on Bycatch was restricted to the Latin America and Caribbean region. Mr Fuentevilla commented that an Ecosystem Approach to Fisheries (EAF) requires involvement of many different stakeholders beyond Fisheries Departments and that this was not easy to achieve. He also added that the Forum on Bycatch was open to all interested parties independently of the region.
23. Mr Blanchard (IFREMER) asked about the difference between a traditional turtle excluding device (TED) and a flexible TED. Mr Fuentevilla (FAO) clarified that traditional TEDs, developed for shrimp trawls, consist of a rigid sorting grid installed near the codend of the trawl. Due to the differences in target species, scale and operation, it is a major challenge to make traditional TED technology work in finfish trawls. The main obstacle is the fact that finfish trawls are mostly retrieved using a net drum. This prohibits the use of rigid TEDs, as they would be bent and crushed

when the net is wound on the drum. To overcome this problem, the Harvesting Systems Unit of NOAA's National Marine Fisheries Service (NMFS), has developed a flexible TED for finfish trawls. Instead of rigid aluminum bars, the grid is made of stainless steel cable, and is also referred to as a cable grid.

24. Ms Monnereau (FAO), Regional coordinator of the Climate Change Adaptation in the Eastern Caribbean Fisheries Sector Project (CC4FISH), presented an overview of project activities. Seven countries are participating in this four-year (2017-2021) project, namely Antigua and Barbuda, St. Kitts and Nevis, Dominica, St. Lucia, St. Vincent and the Grenadines, Grenada, and Trinidad and Tobago. The project aims to increase resilience and reduce vulnerability to climate change impacts in the Eastern Caribbean fisheries sector, through introduction of adaptation measures in fisheries management and capacity building of fishers and aquaculturists. The three components of the project are: 1) Increased awareness and understanding of climate change impacts and vulnerability in the fisheries and aquaculture sector; 2) improved resilience of fisherfolk, coastal communities and aquaculturists; 3) mainstreaming climate change adaptation in multilevel fisheries governance.
25. Mr Blanchard (IFREMER) asked Ms Monnereau (FAO) if there was a review of climate change impacts for the region. She informed that information for the region is scant, but that there was a recent literature review presented by Oxenford and Monnereau (2018) (Chapter 9 in: www.fao.org/3/I9705EN/i9705en.pdf).
26. Mr Willems (FAO) commented that the Sargassum influx phenomenon was also affecting the shrimp and groundfish fisheries of the North Brazil Guianas shelf region. Ms Monnereau (FAO) mentioned that research is in its early stages, and that drivers and mechanisms of Sargassum influx are not clear. At present, modelling efforts are directed to predicting seasonal influx into the Caribbean. Several possible drivers such as runoff from the Amazon and Congo rivers, as well as Sahara dust were also mentioned.
27. Ms Walker (CLME+ Project) asked the representative from Suriname what was the impact of Sargassum influx on the shrimp and groundfish fisheries. Mr Willems (FAO) mentioned that sinking Sargassum accumulates on the fishing grounds and it saturates trawl gear. Also, artisanal gillnet fishing is affected as nets are clogged with Sargassum affecting catchability and increasing working hours for net cleaning. Mr Blanchard (IFREMER) mentioned that a similar problem exists for artisanal gillnets in French Guiana.

Status of shrimp and groundfish stocks in the north Brazil Guianas shelf

Brazil

28. Ms Padovani (Federal University of Pernambuco) and Ms Bentes (Federal University of Para) were not able to attend the meeting in person and made their presentation on the status of data collection and management of shrimp and groundfish fisheries from North Brazil via Skype. They mentioned that official fisheries statistics in Brazil were not available since 2008 and that data collection had not yet been reestablished. The lack of data collection programmes since 2008 has particularly affected the Northeastern and Northern regions. Hence, no additions could be made to the data presented during the 1st WG Meeting in 2015. However, sampling has been conducted on the Southern red snapper (*Lutjanus purpureus*) fishery during 2016 and 2017 in the port of Bragança in the state of Para. Southern red snapper landings were estimated at 2 000 tonnes in 2016 and 2 100 tonnes in 2017, with a coverage of around 90% of landings in this port with an estimated fleet size of 160 red snapper longliners. They also presented ongoing research on tracking and spatial

mapping of fishing activities of industrial shrimp trawlers and red snapper longliners in Northern Brazil.

French Guiana

29. Ms Tagliarolo (IFREMER) presented data available for French Guiana. The marine fishery sector in French Guiana is constituted by three main components: industrial shrimp trawling, Southern red snapper fishery with hand-lines operated by a Venezuelan fleet, and coastal small-scale fisheries using drift nets and targeting coastal fish species. The coastal artisanal fishery, with around 120 boats, contributes from 49 percent to 56 percent of the overall country fisheries production with more than 30 target species, with an estimated discarded bycatch of 17 percent, represented around 2 500 tonnes. The economic value estimated was around USD 6 million in 2010.
30. Shrimp landings and fishing activities have declined sharply in the past few years due to a large drop in shrimp stocks, increase in exploitation costs and decrease of shrimp ex-vessel value. Only 13 vessels were active in 2017, with a production of around 500 tonnes, against 61 vessels in 2000. Before the implementation of TEDs, discards were estimated at approximately 70 percent to 90 percent of the total catches. Southern red snapper is currently exploited by a fleet of 45 vessels, producing around 1 500 tonnes, with an average value of USD 6 million estimated for 2017 landings. Southern brown shrimp (*Farfantepenaeus subtilis*) and Southern red snapper stocks are regularly assessed by IFREMER and considered fully exploited, but no stock assessments are available for the coastal fish species exploited by the coastal small-scale fleet (mainly Acoupa weakfish (*Cynoscion acoupa*), Green weakfish (*C. virescens*), Crucifix sea catfish (*Sciades proops*), among others). Socioeconomic data were collected in 2006, 2009 and 2011 in the context of a research program. A monitoring program is to be implemented beginning in 2018.

Guyana

31. Mr Bumbury (Fisheries Department) presented the status of data collection and management in Guyana's shrimp and groundfish fishery. Guyana's overall mean annual production for the marine capture fisheries is estimated to be 39 216 metric tonnes for the period 2014–2017 with 56.2 percent being landed by the industrial trawl fisheries and 43.2 percent by the artisanal fleet (Chinese seines/fyke nets, drift nets, caddel lines, anchor seines and pin seines). Atlantic seabob (*Xiphopenaeus kroyeri*) is the most important fishery for Guyana representing 48.3 percent of total landings (annual mean of 18 960 tonnes for the period 2014-2017), while artisanal landings of groundfish represent 37.9 percent (annual mean of 14 897 tonnes for the period 2014–2017) and shrimp (Penaeid shrimps and white belly prawn, *Nematopalaemon schmitti*) represent 2.5 percent of total landings (annual mean of 996.5 tonnes for the period 2014-2017). In 2017, the value of landings by the industrial Atlantic seabob fishery was estimated at USD 4.5 million, while artisanal groundfish landings were estimated at USD 110.8 million.
32. The industrial trawl fishery consists of 106 vessels (87 for Atlantic seabob and 19 for prawns) which exploit shrimp, prawn and groundfish species, while there are 1 234 artisanal vessels which target mainly groundfish species. These fisheries, with the exception of the prawn trawlers, operate on soft muddy grounds. The most recent stock assessments were conducted on the commercial ground fish species King weakfish (*Macrodon ancylodon*), Smalleye croaker (*Nebris microps*) and Green weakfish in 2018. An assessment was conducted on the white belly shrimp in 1997 and Atlantic seabob in 2013. The Atlantic seabob is due for another assessment in 2018.
33. The current management measures used in the industrial fishery include the use of TEDs, Bycatch Reduction Devices (BRDs), Vessel Monitoring System (VMS), a closed season, fishing operations

between 7–18 fathoms (as of April 14, 2018, vessels are required to fish deeper than 8 fathoms), a maximum of 225 nominal days at sea, a last haul sampling programme (supplement of the observer program in which the entire last haul is brought to shore to be assessed by the Fisheries Department), a license system to control effort and catch per unit effort (CPUE) used as stock status indicator. The Fisheries Act, 2002, Guyana Marine Management Plan 2013–2018 (to be updated for the period 2018–2022), Captain’s Code of Conduct, Harvest Control Rule (HCR) and General Fisheries Regulation 2017 are the guidelines for fisheries management in Guyana.

34. The major challenges to effective and efficient management of the fisheries are: 1) the collection of accurate data remains a challenge. Approximately half of the artisanal fleet is not licensed. Unregulated establishment of mooring areas, inadequate enforcement and the lack of fish logs from artisanal fleet. 2) Limited socioeconomic data, however, the Fisheries Department in 2016 conducted a socioeconomic survey, which was tailored to collect data for a Caribbean Regional Fisheries Mechanism (CRFM) research. 3) Biological data collection in the artisanal fisheries is not consistent. 4) Approximately, 90 percent of technical staff has under 10 years’ experience. 5) Monitoring Guyana’s diverse and large fleet can result in monthly national targets not always being achieved in terms of fisheries monitoring. This issue is further enhanced by the number of non-operating fishery cooperatives. 5) There is limited sharing of data analyses with stakeholders to improve various aspects of the fishery. Additionally, some fishers tend to not share catch information with the Fisheries Department.

Suriname

35. Mr Yspol (Fisheries Department) and Mr Willems (FAO) presented the status of data collection and management in the shrimp and groundfish fisheries. In Suriname, nearly all marine fisheries target shrimp and/or groundfish, the only exception being the longline fleet for large pelagic fish (e.g. tuna). The artisanal fleet is multi-species and multi-gear, but mainly uses gillnets to target sciaenids and catfishes in the coastal waters. The artisanal fleet accounts for about half of the country’s marine fish catches (approximately 35 000 tons). The trawl fisheries target Atlantic seabob, *Penaeus* shrimp species and demersal fish, while bottom hand liners (Venezuelan fleet) mainly target Southern red snapper.
36. For all marine capture fisheries in Suriname, there is an input restriction by means of fishing licenses, which is obtained from the Fisheries Department of the Ministry of Agriculture, Animal Husbandry and Fisheries (LVV). The license stipulates a number of conditions the fishery should comply with, including restrictions related to fishing area, target species, fishing gear, use of TEDs/BRDs, etc. Penaeid shrimp and sciaenids (weakfishes and croakers) represent the main target species of Suriname’s marine fisheries.
37. In relation to the Marine Stewardship Council (MSC) certification of the Atlantic seabob shrimp fleet (since 2011), the Atlantic seabob stock was assessed in 2009, and a harvest control rule is in place. No other stock assessments have been recently carried out in Suriname; the latest stock assessments dating back to the period 1998-2000, included *Cynoscion acoupa*, *C. virescens*, *C. similis*, *Macrodon ancylodon*, *Nebrius microps*, *Lutjanus purpureus*, *Farfantepenaeus brasiliensis* and *F. subtilis*. Data collection on marine fisheries in Suriname includes the collection of catch and effort data, either on a sample basis (artisanal fleet) or census based (industrial fleet). No biological, social or economic information is collected on a regular basis.
38. A management plan for the fishery (2014-2018) exists, but has not yet received political endorsement. However, several recommendations included in the plan have been implemented. The only binding management currently in place is the Atlantic seabob trawl fishery management plan,

and its implementation is monitored by the Seabob Working Group. Many gaps still exist in the collection and sharing of data, the enforcement of data collection and reporting obligations, and the coordination and management of data collection. These mainly relate to insufficient trained personnel and resources at the management entity. Some of these issues are currently the focus of ongoing national and regional projects in which the Fisheries Department is involved.

Trinidad and Tobago

39. Ms Ferreira (Fisheries Division) presented the status of data collection and management in the shrimp and groundfish fisheries. Trinidad and Tobago's overall production from the marine capture fisheries is estimated to be approximately 13 000 tonnes (12 541 tonnes in 2012; 13 942 tonnes in 2010) with 40 percent of this being landed by the artisanal multi-gear fleet (using nets, lines, pots and seines) and 12 percent by the trawl fleet in 2012. Shrimp represents about 6 percent (from 700 tonnes to 800 tonnes) of the total landings, and Whitemouth croaker (*Micropogonias furnieri*), which is one of the most dominant commercial groundfish species, with around 9 percent (over 1 200 tonnes) of total landings. In 2012, the ex-vessel value of the landings of the artisanal multi-gear fishery was estimated at over USD 15 million, while the shrimp landed by the trawl fleet was estimated to have an ex-vessel value of about USD 4 million and the bycatch over USD 1 million.
40. The trawl fleet is constituted by 103 artisanal and 36 non-artisanal (8 single and 28 double-rigged) otter trawl vessels. The trawl fishery exploits shrimp and groundfish species. The artisanal multi-gear fleet is constituted by 869 vessels using primarily gillnets (monofilament and multifilament), 231 using primarily hand-lines and 55 using palangue (small bottom longlines), targets mainly groundfish. Both fleets operate in the Gulf of Paria (Trinidad's west coast) and in the Columbus Channel (Trinidad's south coast) in largely soft muddy bottoms with some turbidity, seagrass and mangrove, with the trawl fleet also operating on Trinidad's Northwest coast.
41. The most recent stock assessment for the five shrimp species (*Farfantepenaeus subtilis*, *F. notialis*, *Litopenaeus schmitti*, *Xiphopenaeus kroyeri*, *F. brasiliensis*) used data for 1988–2012 from the trawl fleet and found that there was a significant probability that the stocks were overfished and that overfishing was occurring. Assessments of major commercial groundfish species (Whitemouth croaker, Jamaica weakfish (*Cynoscion jamaicensis*) and the lane snapper (*Lutjanus synagris*), using data from the trawl and artisanal multigear fleets (up to as recent as 2006) found these stocks to be from fully exploited to overfished.
42. In terms of management measures for the trawl fleet, there are controls on entry to the fishery for non-artisanal trawlers. There are also regulations with respect to zoning of trawl operating areas by depth and distance from shore, prohibited trawling areas, a minimum codend stretched mesh size of 1.5 inches (3.8 cm), and mandatory use of TEDs by non-artisanal trawlers. With respect to gillnets there are regulations regarding length/width restrictions ($\leq 900\text{ft}/\leq 15\text{ft}$) and minimum diagonal stretched mesh size of 4.25 inches (10.8 cm). There are also regulations that establish a minimum length of 8 inches (20.3 cm) of some key species (snapper, salmon).
43. The major challenges to fisheries management are related to the inadequate legal framework, the current Fisheries Act was enacted in 1916, as well as the severely inadequate fisheries organizational structure. A new Fisheries Management Bill is currently being finalized. With respect to fisheries data collection there has been no ongoing collection of data on discards, which is an issue especially for the trawl and gillnet gears. Trawl observer and logbook programmes are to be implemented under the current REBYC II LAC project. In addition, there are important data gaps, which include landings data that in many cases are not collected to the species level, effort is in terms of days at sea rather than fishing time, fishing areas are not georeferenced. On the other hand, except for ex-vessel price data, there is no ongoing collection of social and economic data.

Information for assessment and management

Update on WECAFC/FIRMS

44. Mr Taconet (FAO) presented the WECAFC-FIRMS partnership. FIRMS is an international information sharing partnership involving 14 international organizations (FAO and Regional Fisheries Bodies) with the goal to facilitate dissemination and access to high quality information on the status of marine resources and fisheries. The WECAFC-FIRMS partnership was endorsed by the 15th Session of WECAFC in 2014 with the goal to initiate information sharing on status and trends among WECAFC members, and catalyze the data collection and research process in support of fisheries management in the Caribbean and adjacent areas. The partnership operates in line with the WECAFC-CRFM-OSPESCA Memorandum of Understanding, and FIRMS focal points have been nominated for WECAFC (Ms Nancie Cummings), CRFM (Ms June Masters) and OSPESCA (Ms Jeanette Mateo).
45. A Task Force composed of these focal points, FAO and CLME+ Project staff drives the activities and meets on a monthly basis by Skype. The activities, which have been supported by two subsequent EU-DG-MARE projects and NOAA (in-kind time of Ms Cummings), as well as other co-funding channeled from other projects in the region, have been guided by the two meetings organized since 2016 (the WECAFC-FIRMS data workshop held in Barbados, 19–21 January 2016, and the Fishery Data and Statistics Working Group (FDS-WG) held in Barbados 14–16 May 2018), as well as by the 16th Session of WECAFC in 2016 and the VIII Meeting of the WECAFC-Scientific Advisory Group (SAG) in 2017.
46. Mr Taconet (FAO) demonstrated the progress achieved by browsing the FIRMS maps viewer, which disseminates more than twenty fishery fact sheets from seven CRFM countries concerning priority species, such as: lobster, queen conch and flying fish. The Regional Database which has been set-up on the iMarine platform, with co-funding from the BlueBRIDGE project, is functional and was also demonstrated through its map viewer. This viewer, meant to become the entry point to WECAFC published data, provides access to FIRMS stocks and fishery fact sheets, to the published datasets of the regional database, and to non-published datasets for authorized users.

Outcomes of the Working Group on Fisheries Data and Statistics

47. Ms Cummins (NOAA) presented a summary of the 1st Meeting of the Fisheries Data and Statistics (FDS) Working Group that took place in Barbados, 14-16 May, 2018. During its 16th Session in 2016, WECAFC agreed to establish a working group for fisheries data and statistics (FDS-WG) matters, based on the ongoing work of the WECAFC-FIRMS partnership and supported the development of a regional database in collaboration with the member countries and partners in the region.
48. The proposed WECAFC Data Collection Reference Framework (DCRF) lays the foundation of fisheries data and statistics collection and collation. The WECAFC DCRF will feed the needs of developing, monitoring, assessing and reviewing regional fisheries policies such as Fishery Management Plans (FMPs) as required by a Regional Fishery Management Organization (RFMO). The WECAFC DCRF incorporates inspiration from other RFMOs data collection frameworks (e.g. the 2016 General Fisheries Commission for the Mediterranean (GFCM) DCRF and from the International Commission for the Conservation of the Atlantic Tunas-ICCAT), thus promoting best practices and harmonization of data collection throughout the world. The WECAFC DCRF

incorporates the unique specificity of the WECAFC region country-level challenges and practicalities in the different types of data needs. The DCRF provides a baseline for minimum data requirements to support evidence-based fisheries policy. The preliminary version was well received and there was good discussion on the various tasks (catch, effort, fleet, biological data, and incidental catches). In the review process, the working group requested some editorial changes, but no addition or deletion in the proposed tasks on main data types to be collected.

49. The objectives of the 1st Meeting of the FDS WG were to develop consensus on the WG Terms of Reference and outline the priorities in supporting collection of fisheries data and statistics in the WECAFC region, review and validate minimum data requirements in support of fisheries management and stock assessment, with related policies and guidelines for implementation, and identify priorities (in terms of filling gaps in knowledge) for fisheries data collection and statistical analysis in the WECAFC area.
50. The workplan established by the FDS WG foresees sharing through CRFM, OSPESCA, and WECAFC for validation and further contributions by member countries (e.g. on data sharing policy aspects) by the national fisheries authorities and other regional working groups. Also, to seek input on the DCRF from WECAFC/CRFM/IFREMER Shrimp & Groundfish Working Group. The DCRF will be consolidated by the FDS-WG prior to review by the Scientific Advisory Group (SAG) of WECAFC for final submission to the Commission. Additionally, to begin the implementation phase for populating the regional database (RDB) and recognizes the need for a regional workshop for all WECAFC members to use the RDB.
51. The FDS WG requested for the Shrimp and Groundfish WG members to review / contribute on the DCRF, collaborate with FDS-WG members to identify training opportunities for initializing the WECAFC RDB, and developing FIRMS inventories. To support participation in FIRMS FDS-WG data calls (for contribution to the RDB) through: FIRMS stock status fact sheets, inventories of shrimp and groundfish stocks and fisheries, and on the status of shrimp and groundfish stocks.

Summary of the state of data and statistics for shrimp and groundfish

52. Mr Blanchard (IFREMER) made a brief summary on the state of fisheries data and statistics in the sub-region. He mentioned that the presentations made by the different countries and by the WG on FDS were done in order to assess data availability in the sub-region, as a mean to support management of the shrimp and groundfish fisheries. He mentioned that the primary data on the industrial shrimp fisheries and some commercial bycatch species seemed adequate. It is, however, necessary to improve communication, coordination and information sharing among the countries in the region. Nevertheless, there are important data gaps concerning the artisanal fisheries, as well as the lack of official fishery statistics from Brazil since 2008.
53. On the other hand, Mr Blanchard (IFREMER) mentioned that IUU fishing remains an important issue in the region that has not been addressed and quantified. Also, data on socio-economic aspects of shrimp and groundfish fisheries remains scarce. There is also a need for training in stock assessments methods as capacity in the region is still very limited. Mr Blanchard brought up the question of how to improve data collection and enforce information on landings, especially from the artisanal fisheries. Mr Lall (CNFO) mentioned that non-registered small scale vessels is an important issue in relation to fishery statistics and IUU fishing.
54. Ms Walker (CLME+ Project) asked how bycatch was defined. The question prompted some thoughts and comments on the subject and, for example, Mr Ragnauth (French Guiana) mentioned that in French Guiana all bycatch is discarded and that it was necessary to develop a market for

bycatch species. In other countries the situation is different as there are local markets for bycatch species from the industrial trawl fisheries.

Update on the status of stock distribution, including genetic analysis

55. Ms Tagliarolo (IFREMER) made a presentation on genetic analysis of shrimp populations. Penaeid shrimps are among the main targets of the industrial fisheries in the Guianas shelf. Stock assessment results from French Guiana show an important decline over the past decade. Stock assessment and management is currently established at a national level despite that natural stocks are probably shared between several countries. Fisheries acts on wild stocks with hard-defined boundaries and the development of an appropriate management plan requires a better understanding of the connectivity patterns.
56. French Guiana researchers recently started a project (funded by IFREMER) to investigate the genetic composition of Penaeid shrimps in Suriname, French Guiana and North Brazilian waters. The sequencing of the mitochondrial cytochrome oxidase subunit 1 (CO1) gene will shed some light on the presence of cryptic species and on population dynamics. This project constitutes the first large scale genetic study in the area providing some baseline information for the development of future joint programs focused on population genetics.
57. Mr Blanchard (IFREMER) made a presentation regarding the possible effects of climate change on species distribution in French Guiana. He commenced his presentation by formulating the question if climate change is an emerging issue for shrimp and groundfish resources and their related fisheries in the Brazil-Guianas shelf. He presented the example of the projected global effects of climate change on 1 060 species of fish and invertebrates by the year 2050, based on a high range climate change scenario. Model outputs showed an increase of species invasions in temperate and polar waters, and an increase in local extinctions in the tropical and temperate zones. For example, the Atlantic cod (*Gadus morhua*) over a 30 year period showed a projected shift from north temperate waters to arctic waters, especially in the Northeast Atlantic.
58. Mr Blanchard (IFREMER) presented data that showed an increase of around 1° C over the last 30 years in waters of French Guiana. He also presented results from a series of trawl surveys from the 1990s to 2017 that indicate a decrease in the proportion of sub-tropical species and an increase in the proportion of tropical species, especially for rays. Mr Blanchard mentioned that climate change effects have been identified at large spatial scales and over mid to long term temporal scales for global fauna, but that at local scales it was very difficult to disentangle environmental and fishery induced changes in abundance of fish populations.
59. Mr Blanchard (IFREMER) finished his presentation by asking if climate induced effects had been observed in other countries in the region, if it should be considered a critical issue in the short term, and if other critical issues had been identified as, for example, Sargassum influx. On a question by Mr Willems (FAO) on how had the species been differentiated into tropical and sub-tropical, Mr Blanchard answered that it was based on direct observations and species classifications.

Assessment and management of data poor fisheries

60. Mr Mendoza (FAO) made a presentation on assessment and management of data limited fisheries. In a simplified format fisheries management can be viewed as the combined result of monitoring (data), assessment and decision rules. A stock assessment is an integral part of a fisheries management system as it allows, based on the available data, to determine the state of the fishery in relation to relevant reference points and, hence, indicate what actions may be taken to meet

management objectives. Options for stock assessments methods are conditioned on data available, and go from qualitative methods (e.g. traditional ecological knowledge or expert judgement), where no reference points are estimated, to complex quantitative fish stock assessment models (e.g. statistical catch at age/length methods). From the data poor to the data rich situations assessment options can be classified into 3 groups: risk based, empirical assessments and model based stock assessments.

61. The simplest model based assessments use data on catch (Catch only models) or length frequencies (e.g. length based spawning potential ratio) in combination with ancillary data such as growth or length at maturity. Catch only methods are widely used, for example, in the United States of America, where several hundred stocks are classified as Only Reliable Catch Stocks (ORCS). In the simplest approach a scalar is used to correct catch levels depending on exploitation history, if ancillary information (e.g. estimates of natural mortality) is available then model based methods such as Depletion Corrected Average Catch (DCAC) or Depletion Based Stock Reduction Analysis (DBSRA) can be used. Depending on the method of choice, catch only methods require a history of catches and estimates of current depletion, usually based on expert judgment, and biological parameters such as natural mortality and resilience.
62. Stock assessments allow for a quantitative framework to maximize yields given a set of objectives, incorporate multiple sources of data and information and their uncertainty, allow forecasting and testing of management options, provide widely accepted quantitative measures of stock status, and are transparent and replicable. However, despite these advantages, it is not always possible to apply stock assessment models.
63. In the absence of quantitative stock assessments it is possible to use fishery performance indicators based on a diverse array of metrics. The current state of the fishery is determined based on the current value of an indicator (e.g. CPUE, mean length) in relation to a target or reference value. Ideally, several indicators are used simultaneously to determine the state of the fishery and subsequent management actions.
64. In concluding, Mr Mendoza (FAO) underlined that stock assessments are used to quantify stock status with respect to reference points and to evaluate the effect of different management options. Assessed stocks have a better chance to be sustainably managed. However, data and technical complexities may preclude use of model-based approaches. Formal stock assessments are desired, since they provide quantities to be used for management and can incorporate uncertainty in decision making. When information is scarce or of bad quality, management should be increasingly precautionary. When data is not sufficient, empirical indicators and decision rules should be used to inform management.

Sub-regional EAF fisheries management plan

65. Mr Mendoza (FAO) made a presentation on CLME+ project activities related to developing a sub-regional Ecosystem Approach to Fisheries (EAF) management plan for the shrimp and groundfish fisheries of the NBSLME. Mr Mendoza mentioned that there were two outputs of the project that were directly and explicitly related to developing EAF Fishery Management Plans (FMPs). The first was for the development of a sub-regional EAF FMP (Output 3.2.3.1.) and the second was for the national implementation plans for the sub-regional EAF FMP (Output 3.2.3.2.).
66. According to FAO a FMP is “a formal or informal arrangement between a fishery management authority and interested parties which identifies the partners in the fishery and their respective roles, details the agreed objectives for the fishery and specifies the management rules and regulations

which apply to it, and provides other details about the fishery which are relevant to the task of the management authority”. Whether developed for a single stock or multiple stocks, the minimum contents suggested for a FMP are: 1) a description of the fishery, especially its current status and any established user rights; 2) the management objectives of the plan; 3) how these objectives are to be achieved (management measures and rules); 4) how the plan is to be reviewed and/or appealed; and 5) the consultation process for review and appeal. Mr Mendoza (FAO) then presented examples for contents of FMPs, including the example of an EAF FMP for the fishery of small pelagics in the Canary Current LME along the coast of Northwest Africa.

67. The steps necessary for developing an EAF FMP were also presented and include: 1) initiation and planning; 2) identify and prioritize issues; 3) develop the management system; and 4) implement and monitor. Mr Mendoza (FAO) also recalled that during the previous phase of the CLME+ project steps 1 and 2 had been addressed as stakeholders had been identified and introduced to EAF, scoping and baseline reports had been prepared by participating countries; broad management objectives were defined, main issues had been identified and ranked, and preliminary discussions on management measures had been held. However, it would be necessary to update baseline data, briefly overview component trees and the risk assessment in order to check if any priority issues had changed, and then proceed to develop and implement the management system.
68. Finally, Mr Mendoza (FAO) presented CLME+ Project activities related to fisheries management that included ongoing work on the development of an EAF FMP for the shrimp and groundfish fisheries of Brazil in collaboration with the REBYC II LAC project, and upcoming activities in other countries that included the development of an EAF FMP for shrimp and groundfish fisheries of Suriname, workshops in Guyana for training fisheries staff and other stakeholders in EAF, and the establishment of national working group on shrimp and groundfish in Trinidad and Tobago. Additionally, Mr Mendoza mentioned that the development of the management plans at sub-regional and national levels required updating of stock status of main species exploited by industrial and artisanal fisheries in the region, which in turn would require several activities such as data review, training in stock assessment and a stock assessment workshop.

Governance effectiveness assessment framework

69. Mr Mahon (CERMES) introduced the Governance Effectiveness Assessment Framework (GEAF), which the CLME+ Project has adopted as the basis for assessing the long-term effectiveness of the CLME+ SAP. The GEAF was explained as providing a broad integrated, policy level assessment. It comprises seven categories of indicators which together are expected to provide a complete picture of the effectiveness of implementation. The categories are: governance architecture, governance process, stakeholder engagement, social justice, ecosystem pressure, ecosystem state and human well-being. He noted that these represent a time sequence with the outputs of some categories (e.g. architecture and process) being expected earlier than the outcomes in other categories (e.g. ecosystem state and human well-being) which may even take decades before there are measurable improvements.
70. Mr Mahon (CERMES) explained that the role of CERMES in the CLME+ Project was to ensure consistency in the application of the GEAF across the entire CLME+ Project and its Sub-projects. Consequently, the GEAF would be applied in the Shrimp and Groundfish Sub-project. He explained that the application of the framework would comprise indicators in all seven categories for each of the three issue areas in the CLME+ Project: fisheries, pollution and biodiversity/habitats. Mr Mahon went on to show the types of questions and indicators that had been developed for fisheries. These, he said, could be scaled down from the entire CLME+ region to the Guianas-Brazil Region by developing the indicators for only the countries and fishery resources of this region. He indicated

that this was to be the next step in developing the GEAF indicator set for the Shrimp and Ground Fish Sub-project.

71. Mr Mahon (CERMES) noted that, while the Shrimp and Groundfish Sub-project was a fisheries project, there were strong linkages with pollution and degradation of coastal habitats many of which are important nursery areas. He also noted that there was a parallel CLME+ Sub-project on Ecosystem Based Management (EBM) in coastal areas for the Guianas-Brazil region, that would be dealing with pollution and habitats in which the pollution and biodiversity/habitats GEAF indicator sets would be applied. He informed the workshop that there was the expectation that there would be linkages between the two sub-projects, hopefully leading to an overall EBM perspective for the area. He also pointed out that there was a GEF Project being implemented by Conservation International looking at mangrove value and its role as nursery habitats that should also be brought into the picture.
72. Mr Mahon (CERMES) noted that CERMES' role was also to advise on sub-regional governance arrangements in the different sub-projects. He indicated that they would be looking at linkages and policy processes at local, national and sub-regional levels. Of particular concern would be the promotion of a sub-regional governance mechanism for EBM. He suggested that in this regard the WG on Shrimp and Groundfish should consider a ministerial meeting towards the end of the sub-project to which combined advice from these three initiatives could be brought; and that if this process was made regular it could constitute the integration mechanism that was thought to be needed for the sub-region.

Regional strategy on bycatch management

73. Mr Fuentevilla (FAO), Regional Coordinator for the REBYC-II LAC Project, introduced the topic by highlighting the regional objectives of the project and providing a quick update on project successes and activities. The project on Sustainable Management of Bycatch in Latin American and Caribbean Bottom Trawl Fisheries (REBYC-II LAC) seeks to improve bottom trawl fisheries in the region by applying an ecosystem-based approach to bycatch management. This includes reviewing and updating legal frameworks, increasing capacity to apply EAF, improving data collection and monitoring, reducing bycatch through best practices and measures, and develop incentives to effect change amongst trawling practitioners. Six countries (Brazil, Colombia, Costa Rica, Mexico, Suriname and Trinidad and Tobago) are executing the project, with varying levels of success. Project details can be found at the dedicated REBYC-II LAC Website www.fao.org/in-action/rebyc-2/en/.
74. One of REBYC-II LAC's main objectives is the development of a regional strategy on bycatch management in bottom trawl fisheries for Latin America and the Caribbean. The regional strategy is a core output of Component 1: Improving institutional and regulatory arrangements for shrimp/bottom trawl fisheries and bycatch co-management (within an EAF management framework). Mr Fuentevilla (FAO) noted that during the preceding two years, REBYC-II LAC stakeholders developed various elements of the strategy, but the Working Group meeting was the first opportunity to discuss and compile these elements into a coherent strategy.
75. To review the elements of the draft strategy, the working group members split up in three smaller groups, one included Trinidad and Tobago and Suriname, one included Guyana and French Guyana and the final one included members of Academia and NGOs. Each group reviewed the strategy elements proposed by REBYC-II LAC stakeholders. The whole group discussed initial changes and recommendations in plenary. Appendix 3 presents the first version of the strategy, based on the

inputs from the working group members. This version will be refined into a working draft document in the following months and then sent to regional partners for discussion and comments.

76. Once the working draft is available, it will be shared across the region for additional comments and inputs. Regional meetings such as the Gulf and Caribbean Fisheries Institute (GCFI) Conference and the WECAFC SAG and national meetings such as REBYC-II LAC meetings, national management committee meetings and thematic workshops are all opportunities to discuss the strategy. A draft strategy should be ready in January 2019, so that it may be discussed at WECAFC preparatory meetings as well as OSPESCA and CRFM general meetings. The goal is to introduce the regional strategy to the 17th Session of WECAFC for approval.
77. Mr Fuentevilla (FAO) noted that the development of the Sub-Regional Management Plan on Shrimp and Groundfish and the development of the Regional Strategy on Bycatch Management on bottom trawl fisheries are linked and close coordination is required between REBYC-II LAC, CLME+ and project partners. Eventually, the strategy should be an element of the sub-regional management plan. Mr Fuentevilla agreed to compile any additional comments on the strategy in the first few months and distribute the next version in early September 2019. He will follow up directly with countries and partners to receive further comments and suggestions.

Recommendations to wecafc

78. The working group revised in plenary the draft recommendations to be submitted to the 17th Session of WECAFC. The recommendations would be presented to the WECAFC Secretariat for information and review and then to the Scientific Advisory Group for final review before presentation to the 17th WECAFC Session. The draft recommendations agreed by the working group are presented in Appendix 4.

Next steps for working group

79. The WG agreed on a series of activities to be developed during 2018-2019, which are presented in the following table:

Activity	Timeframe	Responsibilities
1. Finalization, publication and dissemination of the Report of the WG meeting in Barbados	September 2018	CRFM/IFREMER/WECAFC and FAO with inputs from meeting participants
2. Provide technical and scientific advice to national governments and WECAFC Commission	May 2018– December 2020	WG members;
3. Report to the: - 17th session of WECAFC, January – March 2019 - 9th meeting of the WECAFC Scientific Advisory Group (SAG), November 2018.	As deadlines for reporting require	WECAFC Secretariat
4. Support formulation of sub-regional plan for IUU fishing in Guianas-Brazil Shelf by attending IUU meeting and providing inputs to drafting process	May- October 2018	Working Group with Support from CLME+
5. Collaborate with the Data and Statistics Working Group to respond to the requirements presented at the Working Group's meeting	December 2018	Working Group Members supported by

- Identify focal points for provision of shrimp and groundfish data	July 2018	IFREMER/CRFM and WECAFC
6. Formulate draft sub-regional management plan for shrimp and groundfish in the Guianas-Brazil Shelf	December 2019	Working Group with Support from CLME+ and Members
7. Reactivate stock assessment work: - Data Prep and Parameter workshop - Training in stock assessment for WG Countries - Carry out planned periodic stock assessments	Fall 2018 for trainings. Stock assessment for priority species March 2019	IFREMER/ CRFM/WECAFC in collaboration with NOAA, IDB, CLME+ and FIRMS
8. Collaborate and provide inputs for the execution of an Investment Plan for Investment in EAF management	December 2019	IFREMER/CRMF/WECAFC with support from IDB, REBYC-II LAC, CLME+ and CC4FISH
9. Develop draft Regional Strategy on Shrimp by-catch and introduce to 17 th Session of WECAFC.	January 2019	Working group Members with Support from CRFM/WECAFC/IFREMER and REBYC II LAC
10. Review and suggest inputs, targets and indicators for the CLME + SAP and contribute to the shrimp and groundfish indicators of the GEAF framework	December 2018	Working Group Members.
11. Develop communications and work strategy between working group members for inter-session period - Including common work-space and document repository	August 2018	CRFM/IFREMER and WECAFC to suggest, members to endorse
12. Next Session of Working Group- intersessional meeting	March 2019	IFREMER in collaboration with WECAFC /CRFM and CLME+

Date and place of the next meeting

80. It was agreed that the next meeting of the working group would be organized in the 1st quarter of 2019 with support from the CLME+ and REBYC II LAC projects. The Convener and WECAFC Secretariat would inform members of any developments in this respect.

Closure of the meeting

81. Mr Blanchard (IFREMER), Working Group Convener, thanked all working group members and other participants for their active participation and contribution to the meeting. He wished all participants safe travel to their respective countries.

82. The meeting was adjourned on Friday, May 18th at 17:30 hours.

Appendix 1. List of participants

WECAFC/CRFM/IFREMER Working Group (WG) on Shrimp and Groundfish in the North Brazil- Guianas Shelf held in Barbados 17–18 May 2018

COUNTRIES

BRAZIL

Beatrice Padovani Ferreira
Professor
Federal University of Pernambuco
Av. Arquitetura
S/n Campus Universitario
Recife, Pernambuco

Bianca Bentes
Federal University of Pará
Alameda Leandro Ribeiro, Praça da
República, Bairro Aldeia
CEP: 68600-000

FRENCH GUIANA

Fabian Blanchard
Chef
Laboratoire des Ressources
Halieutiques
Station IFREMER de Guyane
Domaine de Suzini
BP 677, 97300 Cayenne

Morgana Tagliarolo
Researcher
Station IFREMER de Guyane
Domaine de Suzini
BP 677, 97300 Cayenne

Leonard Ragnauth
Member
Comité Regional des Peches et Elevage
Marin De la Guyane
14 Rue Bonneton 97300
Cayenne

TRINIDAD AND TOBAGO

Lara Ferreira
Senior Fisheries Officer (Ag.)
Fisheries Division
Ministry of Land and Marine Resources
#35 Cipriani Boulevard
Newton, Port-of-Spain
Tel: (868) 623-8525/6028/9358
Fax: (868) 623-8542

Ramzan Mohammed
Boat Owner/ Fisherman
#1 Soogrim Street
Drange Valley
Couva

GUYANA

Randy Bumbury
Fisheries Officer
Fisheries Department
Ministry of Agriculture
Regent and Vlissingen Roads
Georgetown

Pamashwar Jainarine
Chairman
Upper Corentyne Fishermen's Coop
Society
25, #17 Village. Corriverton, Berbice

SURINAME

Mario Yspol
Head of Fisheries Statistics
Department of Fisheries
Ministry of Agriculture, Animal
Husbandry and Fisheries
P.O. Box 1807
Cornelis Jongbaw Straat 50
Paramaribo

Wilma Bonse
Boat Operation Administration Officer
CEVIHAS
Paramaribo

ORGANIZATIONS

CARIBBEAN LARGE MARINE
ECOSYSTEM PROJECT (CLME+)

Laverne Walker
Senior Project Officer
CLME+ Project (UNDP/GEF)
Edificio Chambacú, Cra 3B# 26-78, Sector
Torices, Cartagena, Colombia

CARIBBEAN NETWORK OF
FISHERFOLK ORGANISATIONS
(CNFO)

Mark Lall
Secretary
CNFO
Kasimbogwog 46
Miouw Amstokdam
Commowyno

CARIBBEAN REGIONAL FISHERIES
MECHANISM (CRFM) SECRETARIAT
Maren Headley
Research Graduate, Research and Resource
Assessment
CRFM Secretariat
Princess Margaret Drive
Belize City, P.O. Box 642
Belize

CENTRE FOR RESOURCE
MANAGEMENT AND
ENVIRONMENTAL STUDIES
(CERMES)

Hazel Oxenford
Professor of Marine Ecology & Fisheries

Patrick McConney
Senior Lecturer

Robin Mahon
Professor

The University of the West Indies (UWI)
Cave Hill Campus
St Michael, Barbados

NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
(NOAA)

Nancie Cummings
Stock Assessment Analyst
Department of Commerce, National
Marine
Fisheries Service, Southeast Fisheries
Science Center
Florida, USA

FOOD AND AGRICULTURAL
ORGANIZATION OF THE UNITED
NATIONS (FAO)

Yvette Diei Ouadi
Fisheries Officer
FAO Headquarters
Viale delle Terme di Caracalla
00153 Rome, Italy

Carlos Fuentesvilla
Project Coordinator
REBYC-II LAC
FAO
2nd Floor United Nations House
Balmoral Gap, Marine Gardens
Christ Church
Barbados

Nakeida Gibson
Administrative & Operational Support
Officer
REBYC-II LAC
FAO
2nd Floor United Nations House
Balmoral Gap, Marine Gardens
Christ Church
Barbados

Yann Laurent
Fisheries Information System Expert
FIAS
FAO Headquarters
Viale delle Terme di Caracalla
00153 Rome, Italy

Iris Monnereau
Coordinator
CC4FISH Project
FAO
2nd Floor United Nations House
Balmoral Gap, Marine Gardens
Christ Church
Barbados

Marc Taconet
Chief
FIAS
FAO Headquarters
Viale delle Terme di Caracalla
00153 Rome, Italy

Tomas Willems
National Project Coordinator
REBYC-II LAC
FAO
Cornelis Jong Bawstraat 50
Paramaribo

CONSULTANTS

Jeremy J. Mendoza
Project Coordinator
Shrimp and Groundfish in the North Brazil
Large Marine Ecosystem
FAO
Calle Santa Comba 12
Madrid, Spain

Appendix 2. Meeting agenda

Day 1: Thursday May 17th	
	Opening Session
08:30 - 09:00	Welcome addresses and opening of the workshop <ul style="list-style-type: none"> - FAO Representative - Fabian Blanchard – Working Group Chair
09:00 - 09:30	Overview of workshop objectives and expected outputs - adoption of agenda
09:30 - 10:00	Update on the work and terms of reference for the Working Group <ul style="list-style-type: none"> - Quick review and summary of TORs approved by WECAFC.
10:00 - 10:15	<i>Coffee break</i>
10:15 – 10:45	Update on regional projects <ul style="list-style-type: none"> - CLME + Shrimp and Groundfish (including contribution to SOMEE report) and SAP indicators and targets - REBYC-II LAC - Any other project or initiative
10:45 – 12:15	Status of Shrimp and Groundfish Stocks in the Northern Brazil Shelf <ul style="list-style-type: none"> - Status of Fisheries in Countries (Brazil, Guyana, French Guyana, Suriname, T&T and Venezuela) – 10 mins each
12:15 - 13:45	<i>Lunch</i>
14:00 – 15:30	Session 1: Information for assessment and management <ul style="list-style-type: none"> - Update on WECAFC-FIRMS - Outcomes of the WECAFC WG on Data and Statistics - Summary of the state of data and statistics for shrimp and groundfish - Update on the status of stock distribution, including genetic analysis (EAF & Climate Change included)
15:30 – 15:45	<i>Tea break</i>
15:45 – 16:30	Session 1: Information for assessment and management (cont'd) <ul style="list-style-type: none"> - Assessment and management of data poor fisheries (presentation + Q&A)
16:30 – 17:30	- Assessment and management of data poor fisheries (discussion)
Day 2: Friday May 18th	
08:30 – 09:00	Summary and conclusions of Day 1 – Agenda for Day 2
09:00 – 10:00	Session 2: Sub-Regional Management Plan <ul style="list-style-type: none"> - Update on results of CLME Project and goals for CLME+ - Example of multi-country management plan - Status of national management and sub-regional management plan (Discussion/feedback)

10:00 - 10:15	<i>Coffee break</i>
10:15 – 12:00	Session 2 (cont'd): Sub-Regional Management Plan <ul style="list-style-type: none"> - Discussion on scope and needs - Workplan - Core elements of the workplan
12:00- 13:30	Lunch
13:30 – 15:30	Session 3: Regional strategy on bycatch management <ul style="list-style-type: none"> - Review of the draft regional strategy - Discussion and recommendations - Agreement on next steps for endorsement at WECAFC
15:30 – 15:45	<i>Tea break</i>
15:45 – 16:45	Session 4: Next steps for Working Group <ul style="list-style-type: none"> - Urgent regional needs - Work proposal for intersession period - Update of WG Terms of reference
16:45 – 17:30	Wrap up and conclusions and close <ul style="list-style-type: none"> - Adoption of Working Group recommendations to 17th Session of WECAFC
17:30	<i>Meeting Adjourned</i>

Appendix 3. Draft regional strategy on bycatch management

Working Document

Regional Strategy on the Management of bycatch and discards in Latin American and Caribbean [WECAFC] bottom trawl [shrimp and groundfish] fisheries

May 18, 2018

1. Introduction

a. Background

To be defined once strategy is completed.

b. Definition of bycatch

Paragraph 2.4.1 of the International Guidelines on Management of Bycatch do not provide an agreed definition of bycatch *“because of the very diverse nature of the world’s fisheries, historical differences in how bycatch has been defined nationally, ambiguities associated with bycatch related terminologies and choices of individual fishers on how different portions of their catch will be used. Also, there are functional interpretations of bycatch that include catch that a fisher did not intend to catch but could not avoid, often did not want or chose not to use. There are also regulatory interpretations of bycatch in fisheries management plans and these types of interpretations may not necessarily coincide.”*

To execute this strategy effectively, the following definitions are agreed upon:

Target Catch - The catch of a species or species assemblage which is primarily sought in a fishery.

Bycatch and discards - Retained catch of non-targeted species as well as the portion of the catch returned to sea because of economic, legal or personal considerations. Catch of non-targeted species, both retained and/or returned to sea dead or alive.

Countries themselves must determine more specific definitions in the context of their national fisheries management regulations and practices.

c. Why a regional strategy?

Regional collaboration in bycatch management is necessary, considering the transboundary nature of the marine environment and resources. This is especially true with respect to bottom/shrimp trawl fisheries where many of the bycatch issues and concerns are shared across the region. Well-tested and effective solutions benefit all countries in the region, particularly considering the increasingly strict import requirements established by the large seafood markets of North America and the European Union. Regional organizations such as CRFM, OSPESCA and WECAFC must lead the effort to implement this strategy and strengthen and promote experience sharing and mobilization of political support. With the help of RFBs – CRFM, OSPESCA and WECAFC – regional cooperation that allows for experience-sharing and mobilization of political support for action will be promoted.

In this context, WECAFC, CRFM and OSPESCA have all passed resolutions calling for the implementation of the International Guidelines on the Management of Bycatch and Discards.

A regional strategy on the management of bycatch in bottom/shrimp trawl fisheries establishes a framework for the support and collaboration required to improve the sustainability of these fisheries.

2. Vision

Reduce unsustainable bycatch and discards in Latin American and Caribbean bottom/shrimp trawl fisheries to the maximum extent possible by working in collaboration with fishers and other stakeholders through an Ecosystem Approach to Fisheries.

3. Strategy objectives

- a. **Apply an Ecosystem Approach to Fisheries for the management of bycatch and discards** using management best practices, where all species caught in a defined unit must be considered for management and where management plans and measures must reflect bycatch and discards.
- b. **Improve data collection and monitoring procedures** and updating national and regional fishery statistics databases. This includes collecting regular catch composition surveys, monitoring landings and logbook reports and using on-board observers. It also includes data collection on socio-economic variables that are drivers of bycatch and discards such as fisher/boat income, ex-vessel prices, cost distribution and market availability.
- c. **Bycatch reduction using TEDs and BRDs** and developing improved bycatch reduction devices through standard methodologies that include participatory research and transfer of technology.
- d. **Evaluate the use of spatial and temporal measures** to reduce bycatch and protect critical species and life history stages
- e. **Utilizing sustainable bycatch** by promoting investment and government support in viable value chains. This includes the potential for utilizing bycatch in school and community feeding programs.
- f. **Strengthened communication, coordination and information sharing** through regional partners to disseminate best practices in bycatch management. WECAFC/CRFM and other regional partners to provide best technical support available and monitor the implementation of the strategy.

4. Strategic actions

A. Managing bycatch through an ecosystem approach to fisheries

1. The management of bycatch and discards in Latin American and Caribbean bottom trawl fisheries follows an Ecosystem Approach to Fisheries that considers ecological and human well-being as well as an enabling governance framework.
2. Fisheries management frameworks, including management plans and legislation include regulations and or rules for the management of bycatch and discards.
3. Management plans consider ecosystem and stock boundaries rather than political boundaries and consider all other users of same resource and marine space.
4. Management plans that consider bycatch are created in the context of livelihoods and prevention of damage to public goods.

5. Management plans that consider bycatch must consider impacted species including other fishery or non-fishery species including birds, mammals, turtles and habitats (deep-water reefs, benthic invertebrates)

B. Data collection and fishery evaluation

Accurate and timely data collection is crucial to understand the catch composition of bottom/shrimp trawl fisheries in the region. Strengthened monitoring systems allow improved understanding of the impact of bycatch on shrimp and ground fisheries as well as the impact on other fishery species and the of the ecosystem in general.

- **Action step 1:** Strengthen data collection protocols in the region utilizing available data collection methods such as log-books and landings data. Update data collection protocols to standardize bycatch reporting methodologies across the region. Strengthen data access and sharing policies.
- **Action step 2:** Where possible, implement regular on-board data collection methods, including the use of observers, to validate logbook data and more accurately assess discarded bycatch or when not possible use methods such as last haul rule in Guyana, cameras, etc.
- **Action step 3:** Include bycatch and catch composition data into existing national fisheries data collection and statistics systems and/or databases. Cross-reference catch and habitat data to relate catches to habitat types.

Possible data parameters required for bycatch management are as follows:

Parameter	Variables
Biological: Catch and Discard Variables	
Target species/species group	species (or species group)
Total Catch	weight; number, number of baskets/bins/boxes; holds (volume)
Species Composition	sampled species; number of baskets/bins/boxes/holds by species
Average sizes	sampled fish species, length, weight, catch weight by size grades
Bycatch composition	sampled fish species, length, weight, catch weight by size grades/ spp identification /retained species biomass
Discard	Species composition; weight; number of baskets/bins/boxes; whole/macerated
Ratios	Bycatch ratio, discard ratio
CPUE	Catch per tow. Catch/ per day. Bycatch/ tow
ETP/TEP composition/morphology	Threatened, endangered or protected species, size/length/weight/composition/ # spp.
Habitat	Quality/ area/ degradation index / add a bit of information
Abundance	CPUE/ Stock assessment/ stock size, catch rate/ mean size/ recruitment
Economic: Production and earnings variables	
Product type	whole round/green; gutted; boned; headed; fins off; fillet; skin on/off; loin; mince; surimi; fish meal (from

Parameter	Variables
	whole fish/discards/broken or sour/ offal etc.); consumer packs
product storage	whole frozen; IQF; hold frozen; storage temperatures; dry; brine; salted; fresh
product packaging	individually marked and packed (e.g. tunas); carton (type and weight); bag (type and weight); basket (type and weight); barrel
Processing equipment	machine type; production rate, availability
Total Revenue from fishing	Revenue per tow/ annual seasonal revenue/ per trip
net profit from fishing	Revenue minus costs
Landings value	Harvest/catch values by species or group. Value of catch/ trawl type/ gear type
Price of products (value added)	market/export price, ex vessel price (for both target and non-target species)
Cost of bycatch and discards	Loss of future opportunity; cost of habitat damage; income loss/gain across sub-sectors
Fishing Gear/Effort Variables	
Gear	Gear type
Construction	mesh, material, doors, TED, grids, escape doors, diversions etc.
TED/BRD	Material, type, location, size
Trawl Size	Length, depth, headline, foot rope, lazy rope, tickler chain,
Deployment	bottom/mid-water
Subsidiary vessels	dinghies, scout, net boat
Electronics	beacons, sounder, mass sensors, GPS, depth finder AIS
Markings	gear number, vessel identification
Trawl	date, time, speed, positions for "gear set, "on bottom" "at school" closed, off bottom, haul start, on surface, trawl track
Socio-Economic Variables	
Number of persons employed in fishery	Employees by primary, secondary and tertiary sectors, disaggregated by age sex and job category. Time spent in occupation
Unemployment/employment	Unemployment in region/community/nation or #/% of locals in fishery
Earnings	earnings for each crew member/ earnings for each fishing household
Food security	quantity of landings for food/nonfood uses (catch and bycatch); bycatch contribution to local diets; nutrient gains/losses
Earning distribution	Wages as % of cost/ wages in relation to minimum national wage/ revenue distribution on vessel
Poverty	Poverty levels in fishery/community
Livelihoods	Income/earnings from fishing or associated activities
Gender	Disaggregated gender data/role of women/ power distribution/ % of workers that are female, young, male.
Governance Variables	
Normative laws	Number/existence of regulations/laws/ policy/management plans

Parameter	Variables
Policies and objectives	Presence of long term and prioritized policies
Compliance	Fisheries patrols, arrests, sanctions, enforcement/
Transparency	Available information on decision-making/ participation
Management capacity	Management plans/ management staff, fisher knowledge of plans
Management response	Management measures- spatial, temporal closures. Gear regulations, effort regulations, input regulation
Participation	Committees/ Council, participation of fishers/community members in fisheries meetings
Organization strength	Number of organizations, # of member in organizations, # of meetings, perceived influence on decision making
Capacity	Capacity of staff in institutions/fishery organizations, # of trainings, improved knowledge transfer
Data availability and capture	General data availability, fishery information system, ease of access, use in fishery

C. Unsustainable

WECAFC Members will continue to develop and implement bycatch reduction measures. Bycatch reduction measures focus on improvements in fishing practices. These include the use of larger mesh sizes and other changes to the shape and size of trawl nets. Most efforts are now centered on fishing gear innovations such as the use of Turtle Excluder and Bycatch Reduction Devices. Spatial and temporal measures may also be introduced to protect critical areas, life-stages and habitats as well as vulnerable, endangered and protected species. Across the region, management plans and framework must be updated to mandate the implementation of bycatch reduction practices in all bottom/shrimp trawl fisheries.

These recommendations guide the strategy to develop bycatch reduction technologies in the Bottom/Shrimp Trawl Fisheries of Latin America and the Caribbean.

Recommendation 1: Apply the Principles for Development of Bycatch Reduction Devices

PRINCIPLE 1

1. All bycatch reduction processes incorporate the fishing sector and other stakeholders for the entire continuum of activities. This includes the participation of fishers, researchers, government, NGOS and others from the start of planning or inception activities through field trials, result dissemination, and implementation of the chosen technologies.

PRINCIPLE 2

1. Bycatch reduction measures must be evaluated against baseline data.

This must include:

- a. Catch composition baselines across years and seasons
- b. Identification of vulnerable, endangered or critical species
- c. Location of fishing areas
- d. Operational costs

This should include:

- a. Social and economic importance of bycatch
- b. Ecological baseline
- c. Consolidation of information in databases

PRINCIPLE 3

1. Goals and objectives – All countries should establish specific national objectives and targets for bycatch reduction processes. This includes:
 - a. Type and quantity of bycatch targeted by reduction measures.
 - b. Type and quantity of bycatch that can be landed.
2. All countries must establish an objective to reduce the catch of ETP species, and vulnerable life history stages of target and bycatch species.

PRINCIPLE 4

1. All countries must establish a research and development protocol for bycatch reduction devices that is agreed to by fishery stakeholders and that is designed with a scientifically rigorous methodology.
 - a. Taking into consideration the above, it is advantageous to allow fishers to manipulate/" play" or test devices independently so that they are better adjusted to daily operations.
 - b. Fisher innovations must still be field tested under the scientifically rigorous methodology mentioned above.
2. To greatest extent possible, research results should be shared between countries to decrease cost to single country of testing of new fishing gear.

PRINCIPLE 6

3. WECAFC Members promote the communication of the processes and results of their bycatch reduction activities. An information sharing system under WECAFC management will serve as a conduit to share the results of bycatch reduction technology development activities. This system includes the REBYC-II LAC Project web-site, as well as an open Access forum that facilitates regional discussions.

PRINCIPLE 7

4. All WECAFC partners must emphasize results sharing and capacity building activities to improve the private sector's fishing practices. This might include:
 - a. Field visits or monitoring to evaluate bycatch reduction activities
 - b. Joint training for fishers, researchers and other involved stakeholders
 - c. Follow-up by trained international experts on fishing technology.
- **Recommendation 2:** All WECAFC countries should seek guidelines to further develop, test, regulate and enforce bycatch reduction technologies, including turtle excluder devices and bycatch reduction devices.
 - **Recommendation 3:** Evaluate the use of spatial and temporal measures to reduce high volumes of bycatch or critical/vulnerable species.
 - **Recommendation 3:** FAO, NOAA, EU and other international partners will provide technical training and build capacity to introduce and apply bycatch reduction technologies in (bottom trawl) fisheries.

- **Recommendation 4:** Through a participatory and transparent process, countries shall update rules and regulations to mandate the use of bycatch reduction technologies and best practices.
-

D. Sustainable bycatch utilization

a. Principles for bycatch utilization

- Principle 1: Bycatch utilization must only be promoted if it falls within sustainable levels.
- Principle 2: Evaluate the economic, social and environmental feasibility of utilizing bycatch.
- Principle 3: Support the development of business plans and mobilize private and public investment to create value chains derived from bycatch.
- Principle 4: Explore the viability of utilizing bycatch in school or community feeding programs, non-food products. This could provide fishers with a fixed source of demand and protect from significant price drops or market fluctuations.

b. Action plan for bycatch utilization:

1. Define bycatch composition

- ▶ Most WECAFC members have a basic understanding of catch composition and of the species with utilization potential. A first step is to update or complete this information and integrate spatial, temporal and fleet distribution considerations into the data. Fleet distribution considerations include, for example, expansion of trawling into deeper waters and new resources.
- ▶ Countries and partners must define what species or families may be processed together. This may increase supply for a production process (surimi or silage, for example).

2. Define viable bycatch utilization systems/technologies

- ▶ A variety of utilization systems/technologies are available. Utilization programs must define what is the most viable processing system.
- ▶ On-board handling protocols and training are a pre-requisite to effective bycatch utilization systems. Training is required.

3. Establish a pathway for change

- ▶ Government participation is crucial, particularly through public policy and by incorporating bycatch utilization into existing strategic programmes. These changes may be generated through:
 - A public purchasing programme that secures bycatch products for various purposes.
 - Government credits and other low-cost loans to finance bycatch utilization processes.
 - Modify legal and policy frameworks to improve the enabling environment for bycatch utilization (ex. review prohibitions on transshipments) and that engage the sector.
 - Connect various ministries and institutions responsible for promoting healthy diets, consumption, technologies, entrepreneurship, etc.

- ▶ In the private sector, consistent and good revenues are a driver of change. However, the private sector should also consider a paradigm shift in the fishery that includes improved auto-enforcement of regulations and investments in food security. Private sector enterprises should develop pilot utilization projects (in coordination with government and others). This will also necessarily require the involvement, active participation and guidance from the academic and food technology sector.
- ▶ Facilitate international coordination to collaborate on utilization practices and technologies and open potential markets for bycatch derived products.

4. Identify critical institutional changes and pathways

- ▶ Critical institutions for success include Agriculture Ministries, Fisheries Ministries/Departments, Natural Resource/Environmental Ministries, Social Development Ministries and Education Ministries. Research and technological institutions are also common throughout the region and are critical to the success of new food processing initiatives.

5. Identify crucial actors to promote change

- ▶ The private sector is the crucial actor of improved utilization. It must have proactive participation in utilization initiatives, in collaboration with government. Core representatives from fisher organizations and associations are responsible not only for communicating with government, but also relaying information and generating change within their member constituencies.

6. Establish Milestones for Change

- ▶ Each country should establish critical milestones for change regarding utilization. While the REBYC-II LAC hopes to reduce discards by 20%, regional partners must define how much of this reduction shall be due to decreases in bycatch and how much due to improved utilization.

E. Strengthened communication, coordination and information sharing**a. Inputs required**

- **Recommendation 1:** Ensure and promote use and access to data related to bycatch, including those collected under item B of the strategy.
- **Recommendation 2:** Develop science networks and forums on bycatch in trawling. This includes the CRFM/WECAFC/IFREMER Working Group on Shrimp and Groundfish of the North Brazil-Shelf, the WECAFC-FIRMS data management partnership and the WECAFC/OSPESCA/CRFM tri-partite coordination committee.

F. Strategy implementation**a. Inputs required**

Appendix 4. Draft recommendations from WG on shrimp and groundfish for 17th session of WECAFC

**DRAFT RECOMMENDATION WECAFC/17/2019/--
ON THE MANAGEMENT OF SHRIMP AND GROUND FISH RESOURCES
IN THE WECAFC
AREA**

The Western Central Atlantic Fishery Commission (WECAFC),

RECALLING that the objective of the Commission is to promote the effective conservation, management and development of the living marine resources within the area of competence of the Commission, in accordance with the FAO Code of Conduct for Responsible Fisheries, and address common problems of fisheries management and development faced by members of the Commission;

RECALLING that most WECAFC members have endorsed the Caribbean and North Brazil Shelf Large Marine Ecosystem (CLME+) Strategic Action Programme (SAP) and that under its Strategy 6 “Implement EBM/EAF of the Guianas-Brazil continental shelf with special reference to the shrimp and groundfish fishery” the same members are required to “Strengthen the FAO-WECAFC-CRFM sub-regional arrangement for the management of the shrimp and groundfish fisheries, and establish a decision-making capacity for policy formulation and management”;

NOTING the long history of work of WECAFC (since 1975) on shrimp and groundfish resource assessment and biological and economic modeling of shrimp fisheries, that guided the management of these resources by the members, as well as the more recent CLME project Trans boundary Diagnostic Analysis (TDA), which demonstrated the current challenges to the sector, including habitat damage and destruction of mangroves, land-based water pollution, illegal, unreported and unregulated (IUU) fishing, overexploitation of some resources, piracy, and conflicts between stakeholders within the sector and with other sectors;

REAFFIRMING its commitments, made at the 16th session of WECAFC, to work through the WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish in the Brazil- Guianas Shelf to improve sustainability of these fisheries;

MINDFUL of the discussions and outcomes of the latest meeting of the Working Group held in Barbados on the 17th and 18th of May 2018 and that was financed by the REBYC-II LAC and CLME+ projects;

RECOGNIZING the significant contribution of the shrimp and groundfish fisheries to food and nutrition security, poverty alleviation, income generation, and employment for present and future generations in WECAFC area;

REAFFIRMING the need for continued action by all stakeholders to ensure the long-term sustainable use and management of the shared shrimp and groundfish fisheries resources in the region based on the ecosystem approach to fisheries (EAF);

NOTING the concerns of the WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish in the Brazil-Guianas Shelf that available and shared information to inform fisheries management and decision-making processes at the sub-regional level has been reduced over the last 15 years. Researchers and fisheries officers have not received the necessary capacity building to carry out such assessments, most management plans are in draft form only, and enforcement capacity and collaboration in fisheries management is weak;

NOTING that the lack of recent stock assessments of commercially important species in the Brazil-Guianas Shelf cause significant impediment to the sustainable management of shrimp and groundfish fisheries;

ACNOWLEDGING that this capacity building should be contingent on the availability of resources and the means to use the knowledge, abilities, and approaches to stock assessment, bioeconomic analysis and management of fisheries of the Brazil-Guianas Shelf ecosystem.

RECOGNIZING the need to improve data and information to reduce uncertainties in stock assessment methodologies currently used, to investigate whether stocks are shared or not and to monitor the long-term impacts of the trawl and gillnet fisheries on the stocks;

RECOGNIZING that while certain shrimp and groundfish stocks may not be shared by all countries on the Brazil-Guianas Shelf, there are substantial linkages between the fisheries fleets from the different countries and the ecosystems where these stocks are exploited.

CONSIDERING the opportunities offered by the GEF projects on Sustainable management of bycatch in Latin America and Caribbean trawl fisheries (REBYC II LAC) and on Catalyzing Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+), for introducing and testing shrimp fisheries bycatch reduction technologies and fisheries co-management and for increasing regional collaboration in management of the common and transboundary resources, as well as for combating IUU fishing and building of national capacities;

RECOGNIZING the efforts of the CRFM through its Annual Scientific Meetings and intersessional activities, in facilitating assessment of the commercial Atlantic seabob fisheries in Guyana and Suriname, the Southern red snapper fishery in Guyana, as well as the shrimp fisheries, including two species of groundfish – the lane snapper and whitemouth croaker, in Trinidad and Tobago, to provide information in support of fisheries management decision making;

RECOGNIZING efforts made by France, the IFREMER in French Guiana, and in Brazil to carry out Genetic analysis of penaeid shrimps and red snapper;

HIGHLIGHTING the continued certification of the Atlantic seabob fishery in Suriname and the improvements made by Guyana to seek certification of its Atlantic seabob fishery,

PENDING the delivery of additional information by the Working Group, CRFM Continental Shelf Fisheries Working Group meetings and the Scientific Advisory Group (SAG);

ADOPTS in conformity with the provision of Article 6 (h) of the Revised Statutes of the WECAFC the **RECOMMENDATION** that:

1. WECAFC members and partners should ensure Shrimp and Groundfish priority species of the North Brazil- Guianas shelf are included in the Regional WECAFC-FIRMS database¹.
2. WECAFC, in close collaboration with FAO, CRFM, IFREMER and NOAA build capacity² in the Brazil-Guianas region for periodic stock assessment and bioeconomic analysis of priority fisheries to overcome significant knowledge gaps on the status of stocks.
3. WECAFC, in close collaboration with FAO, CRFM, IFREMER and NOAA develops a common methodology for multispecies shrimp and groundfish stock assessments in the sub-region taking in consideration environmental variables. The process to develop the common methodology requires a data and parameter workshop that includes data preparation to be held before end 2018 and builds capacity among the region to use data limited methods for stock assessment,

¹ The database should contain raw data of the collected biological and physical/environmental parameters and the required fishery data (catch, effort, length frequencies, etc.), to support outcomes achieved through stock assessments, bio-economic modeling and other relevant information on shrimp and groundfish fisheries for decision-making process for the management of these resources in the sub-region. The database outputs concerning state of stocks and fishery management status would be made available through the FIRMS website, applying well-established and agreed protocols for data and information sharing compliant with data policies of the participating countries.

² Specifically, capacity should be built to undertake: (i) robust stock assessments (ii) costs and earnings studies of different fisheries of interest in the country/region, (iii) bioeconomic modelling and analysis of technologically interdependent fisheries (e.g. shrimp and snapper fisheries), (iv) bioeconomic modelling of sequential fisheries with fleets harvesting different components of the population structure (e.g. shrimp fisheries targeted by small-scale and industrial fleets in different stages of their life cycle), and (v) alternative bioeconomic models for different species being targeted (i.e. species with different degrees of mobility) and multi-species fisheries, e.g. groundfish and small-scale fisheries.

4. WECAFC, in close coordination with CRFM and IFREMER should facilitate the provision of samples and mobilize necessary resources to complete population genetic studies required to properly manage stocks of critical shrimp and groundfish species of the North Brazil-Guianas Shelf.
5. WECAFC, in close coordination with CRFM, IFREMER and the Secretariat of the Cartagena Convention, develop a sub-regional shrimp and groundfish fishery management plan for the Northern Brazil-Guianas Shelf countries to be presented to the 18th Session of WECAFC for final review and adoption and is in accordance with the best available scientific evidence;
6. Members of WECAFC develop and enforce national level shrimp and groundfish fishery management plans, and put in place appropriate legislation in support of a sustainable shrimp and groundfish fishery.
7. WECAFC, in close collaboration with FAO, CRFM, IFREMER and NOAA develops appropriate methodologies for shrimp and groundfish data collection on catch, catch composition (i.e species and sizes), fishing effort (fleet specific, gear specific) and socio-economic data, for initial implementation by the members from 2018 onwards.
8. The Working Group on Shrimp and Groundfish to assist the Regional Working Group on IUU to develop a regional plan of action to combat Illegal, Unreported and Unregulated (IUU) fishing (RPOA-IUU).
9. The Working Group on shrimp and Groundfish to collaborate with the Regional Working Group on Fisheries Data and Statistics to identify training opportunities for initializing the WECAFC-FIRMS regional database and develop FIRMS inventories.
10. WECAFC, in close collaboration with IFREMER, CRFM, CERMES and Members to evaluate the impact of sargassum on the shrimp and groundfish fisheries and include these fisheries in regional sargassum prediction models and mitigation initiatives.
11. WECAFC to collaborate with OSPESCA and CRFM to develop a regional strategy for management of bycatch in shrimp/bottom trawl fisheries to be completed in a consultative process with the support of REBYC-II LAC project and presented to the 17th Session of WECAFC for its review and endorsement.
12. WECAFC Members to develop strategy for bycatch across all fisheries gears, particularly those that have interaction with ETP species.
13. WECAFC Members with fisheries in the North Brazil-Guianas Shelf to carry out a Ministerial Level meeting, where issues specific to the sub-region, including monitoring frameworks could receive high level support.
14. Working group to utilize the CLME+ SAP M&E framework, inclusive of the Governance Effectiveness Assessment Framework as a tool to monitor progress of shrimp and groundfish fisheries in the region.

The second meeting of the WECAFC/CRFM/IFREMER Working Group on Shrimp and Groundfish of the Brazil-Guianas Shelf was held in Barbados on 17-18 May 2018. The meeting was attended by 25 participants including Working Group members, fisheries officers, fisherfolk representatives, academia, government organizations and FAO.

The participants reviewed and analyzed the current state of data collection and fisheries management in the North Brazil Guianas Shelf.

The current status and necessary steps to develop a sub-regional EAF management plan for shrimp and groundfish were discussed, as well as the need to enhance capacity in stock assessment techniques in the sub-region. Working Group participants reviewed and discussed the draft regional strategy for bycatch management in the WECAFC Area developed by the REBYC II LAC project.

The meeting was made possible through support provided by the FAO-UNOPS Inter-Agency Agreement on “Catalising Implementation of the Strategic Action Programme for the Sustainable Management of Shared Living Marine Resources in the Caribbean and the North Brazil Large Marine Ecosystems” (Project UNJP/RLA/217/OPS), and the Sustainable Management of Bycatch in Latin America and Caribbean Trawl Fisheries (REBYC-II LAC) project,

ISBN 978-92-5-131616-0 ISSN 2070-6987



9 7 8 9 2 5 1 3 1 6 1 6 0

CA5303EN/1/07.19